TITLE 11

DEPARTMENT OF HEALTH

CHAPTER 39

AIR CONDITIONING AND VENTILATING

Historical Note: Chapter 39 of Title 11, Administrative Rules, is based substantially on Public Health Regulations Chapter 28, Air Conditioning and Ventilating, Department of Health, State of Hawaii. [Eff. 7/1/53, am 5/6/64, am 8/17/64; R January 31, 1983]

§11-39-1 Purpose. These rules are adopted under chapter 91, HRS and implements section 321-11(13), HRS and the following objectives:

(1) Seek to assure the adequate and healthful design, construction, installation, and operation of comfort air conditioning and ventilating systems.
(2) Provide minimum ventilation requirements.

[Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-2 Definitions. As used in this chapter:

"Designer" means a registered architect or a professional engineer especially qualified in the mechanical branch.

"Department" means the department of health of the

State of Hawaii.

"Director" means the director of the department of health or a duly authorized agent or representative.

"Mechanical branch" means one of seven specialties in the field of engineering in which a professional license is issued under chapter 464, HRS, and chapter 147, Title 12, Administrative Rules of the Board of Professional Engineers, Architects, Surveyors, and Landscape Architects. Refer to chapter 147, Title 12 for list of specialties.

"Permit" means a permit issued to a designer under this chapter.

"Public buildings" mean any structure used in whole or in part as a place or resort, assemblage, lodging, business, industry, trade, traffic, occupancy or use by the public or by a segment of the public, or by three or more tenants.

"Seal" means an identification stamp as an evidence of registration as a professional architect or professional engineer especially qualified in the mechanical branch by the State of Hawaii.

All technical definitions for this rule shall be governed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers' Handbooks: Fundamentals, Equipment, Systems, and Applications. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-3 References. The following references shall be used as a guide for good engineering practice:

(1) Handbooks of the ASHRAE (American Society of Heating, Refrigerating and Air-conditioning Engineers): Fundamentals (1981 edition), Equipment (1979 edition), Systems (1980 edition), and Applications (1982 edition).

(2) Safety Code for Mechanical Refrigeration, American National Standards Institute (ANSI) Standard ANSI/ASHRAE 15, 1978 edition.

(3) Industrial Ventilation - Manual of Recommended Practice American Conference of Government Industrial Hygienists, 1980 edition.

(4) Standard for Ventilation for Acceptable Indoor Air Quality. ASHRAE Standard 62, 1981 edition.

(5) Thermal Environmental Conditions for Human Comfort. ASHRAE Standard 55, 1981 edition.

(6) NFPA (National Fire Protection Association) Standard 90A. Standard for the Installation of Air Conditioning and Ventilating Systems, 1978 edition.

(7) NFPA Standard 96. Removal of Smoke and Grease-Laden Vapors from Commercial Cooking

Equipment, 1980 edition.

(8) SMACNA (Sheet Metal & Air Conditioning Contractors' National Association) low pressure duct construction standards, 1976 edition. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-4 General requirements. The provisions of these rules apply when a comfort air conditioning system or a ventilating system is to be installed in buildings used or to be used as public buildings.

(1) New buildings. These rules apply to all new buildings. New buildings mean buildings, additions thereto and alterations thereof, for which plans have not been approved by the department previously or construction was not in progress prior to the effective date of these rules.

(2) Existing buildings. These rules apply to all alterations or improvements to existing buildings, including the replacement of any major apparatus or device related to air conditioning or ventilating systems. Existing buildings mean buildings, additions thereto and alterations thereof, structurally completed or for which plans have been approved by the department and construction is in progress prior to the effective date of these rules.

(3) Change in use. These rules apply to every building, or portion of a building, devoted to new use for which the requirements under these rules are more stringent than the requirements covering the previous use.

(4) Design and preparation of plans. All plans and data on air conditioning and ventilating systems shall be prepared by or under the direct supervision of a "designer." All air conditioning installations shall be designed and installed to provide proper comfort as defined in ASHRAE Standard 55, unless constrained by laws of the United States of America or the State of Hawaii for reasons of conservation of energy.

(5) Refrigeration system. The entire installation of refrigeration in connection with air conditioning shall be in accordance with good engineering practice and the provisions of ANSI/ASHRAE 15.

(6) User's responsibility. All users shall maintain air conditioning and ventilating systems in good working order and shall

operate them so as to provide acceptable atmospheric conditions in the enclosure during all periods of occupancy.

(7) Provisions for cleanliness. All parts of installations and equipment which house or handle air used for ventilating purposes shall be designed so as to facilitate sanitary maintenance thereof. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-5 Exemptions. These rules do not apply to the types of systems named below.

(1) Units of four and one-fourth tons refrigeration (fifteen kilowatt) cooling capacity or less are exempt from §11-39-6 provided that they are not part of a multiple installation, with a combined capacity greater than four and one-fourth tons (fifteen kilowatt) furnished to ventilate any room or similar single enclosure; all other sections of this rule shall remain applicable to units of four and one-fourth tons (fifteen kilowatt) or less.

(2) Ventilating systems including multiple installation with a total of two thousand one hundred cubic feet per minute (one thousand litres per sec) capacity or less are governed by these rules but no permit is required. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-6 Permit. (a) No person shall install, alter, or operate an air conditioning or ventilating system without first obtaining from the department a valid permit covering the specific installation, alteration, or operation.

(b) Form 1, Application for Permit, dated July 1981, located at the end of this chapter shall be used as a permit application form and permit.

(c) Revocation, suspension, or denial of permit. The department may on its own motion, or on the complaint of any person, revoke, suspend, or deny a permit after notifying the permittee or applicant and offering him an opportunity to be heard. Revocation, suspension, or denial of a permit shall be grounded on a violation of this chapter. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-7 Design conditions. (a) Outside and inside design conditions. The following design condi-

tions shall be used for air conditioning systems which will be operated at near maximum load in daylight hours, at elevations below three thousand two hundred eighty-one feet (one thousand metres) above sea level:

OUTSIDE		INSIDE	
Dry Bulb	Wet Bulb	Dry Bulb	Relative Humidity
87°F (30.6°C) or higher	75°F (23.9°C) or higher	78°F (25.6°C) or lower	60% or lower

By special application to the director the above conditions may be modified for systems whose loads peak at times when outdoor temperature is much lower than daily maximum or systems at higher altitudes, and in this case design condition shall be as agreed between the designer and the director.

(b) Design cooling load. Minimum allowances to be made in estimating the net instantaneous heat gains in a building shall be in accordance with good engineering practice.

(c) Infiltration. Infiltration air volume rate and the sensible and latent heat gains therefrom shall be determined for air conditioning systems; and where calculated infiltration rate differs from required outdoor air rate, the larger quantity shall be used for calculating the cooling load.

(d) Control. Provision for reasonable control of temperature shall be made for all air conditioning systems. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-8 Outdoor air supply. (a) The outdoor air shall be taken from a clean, uncontaminated source.

(b) Outdoor air shall be ducted to the air conditioning or ventilating apparatus, or mixed with recirculating air in a plenum. Wherever the outdoor air duct is not connected to the apparatus, the mixing plenum shall be properly engineered and free from air contamination sources.

(c) All outdoor air intakes shall be screened and shall be located as far as possible from stacks and vent outlets, but this distance shall in no case be less than twelve feet (three and five-tenths metres). Domestic clothes dryer vents shall not be considered as outlets for this purpose. The distance in each case shall be sufficient to prevent the discharged air from entering the outdoor air intake.

(1) All outdoor air intakes shall be located to be readily accessible for cleaning and shall

be kept in a clean and sanitary condition.

(2) Openings for outdoor air intake shall be designed so that the air face velocity at the intake does not exceed one thousand feet per minute (five metres per second).

(d) The outdoor air from air conditioning systems shall be supplied through a conditioning apparatus directly to each given space during its occupied hours, and the quantity shall conform to the requirements of ASHRAE Standard 62. There shall be an exception to this for occupancies such as hotel guestrooms, apartments, or dormitories where air conditioning is provided within separate tenancies of a multi-room housing type facility, and where openable window air ratio to floor area is provided in accordance with administrative rules and building codes, no outdoor air intake shall be required. This exception should not apply to nursing homes, hospitals, or similar medical facilities.

(1) Outdoor air quantities for ventilation systems shall be provided by means of supply or exhaust fans, and shall conform to the requirements of ASHRAE Standard 62.

(2) The volume of outdoor air provided for sparsely-occupied areas other than those specifically named herein, shall not in any case be less than five hundredths cubic feet per minute per square foot (twenty-five hundredths liter per second per square metre) of floor space.

(3) The outdoor air rate for uses or occupancies other than those specifically named in ASHRAE Standard 62 shall be by agreement between the designer and the director.

(4) If agreed between the designer and the director, a particular occupancy in which tobacco smoking is illegal and does not occur, may have reduced outdoor air requirements, where based on a specified amount per person in ASHRAE Standard 62, by seventy-five per cent, provided a minimum of five cfm per person (two and five tenths liters per second per person) is provided.

(5) Use of activated carbon or other odor-removing means shall not be considered to reduce the required minimum outdoor air quantities. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-9 Air movement, distribution, recirculation, and removal. (a) Air movement and distribution and outdoor air supply shall be maintained without interruption during occupied hours in accordance with good

engineering practice. Proper provision for balancing air distribution shall be made both in duct design and air distribution device application. Air-handling units shall operate continuously, that is without interruption, while the space is occupied except as provided in ASHRAE Standard 62.

(b) Air may be recirculated except where not permitted for hospitals and medical facilities and except that no air from rooms with obnoxious or offensive odors or which is contaminated by other than human occupancy shall be used for recirculation or for the ventilation of another room or enclosure.

(c) Adequate provisions shall be made for air removal from the enclosure by exfiltration or by natural or mechanical exhaust. Motivating force, location of outlets and the volume of air removed through each identified outlet shall be shown on the plans.

(1) Air from occupied areas uncontaminated by other than human occupancy and without odor may be discharged into corridors thence ventilated through toilet rooms or other auxiliary rooms.

(2) Exhaust systems serving toilet rooms or other places with which odors or similarly offensive conditions are associated shall have negative air pressure.

(3) Kitchen exhausts shall not be combined on the same ducts or fans or with any other exhausts. Clothes dryer exhausts may be combined with toilet exhausts.

(4) In a building higher than one floor, where toilets or kitchens on more than one floor are served by the same exhaust fan, the fan shall be continuously operated during periods when the building is occupied. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-10 Hospitals and medical facilities. Air conditioning systems used in hospitals and other medical facilities including long-term care facilities such as nursing homes, chronic disease hospitals and extended care facilities, health centers and medical laboratories shall be designed in accordance with the requirements of the ASHRAE Handbook referenced in §11-39-3(1) and shall conform to the Minimum Requirements of Construction & Equipment for Hospital & Medical Facilities as published by the U. S. Department of Health and Human Services (Publication No. HRA 79-14,500, U. S. Government Printing Office 1978). [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-11 Air filtration apparatus. (a) Filters or approved air cleaning devices shall be installed in connection with all air conditioning systems. This requirement shall apply to all air handled except exhaust air.

(b) Requirements of air purity with regard to dust contained therein shall be assumed to be met if satisfactory and dependable means are provided for removal of particulate matter as follows, for other than hospital-type occupancies:

(1) ASHRAE weight arrestance (where applicable to filter type) shall exceed fifty per cent and ASHRAE dust spot efficiency shall exceed ten per cent, for filters of all air conditioning systems and mechanical ventilation supply systems.

(2) For air conditioning apparatus other than terminal units serving a single room or a single residential apartment ASHRAE weight arrestance shall exceed seventy-five per cent (where applicable to filter type), and ASHRAE dust spot efficiency shall exceed fifteen per cent.

(3) For hospital-type occupancies, filter efficiencies shall conform to §11-39-10.

(c) Air velocity in conjunction with specific types of air cleaning devices shall not exceed the values established for such devices by their manufacturer.

(d) Air filters and their immediate accessories shall be of non-combustible or fire-resistant material. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-12 Systems for ventilating only. (a) Ventilating systems within the scope of these rules shall provide the required ventilation service for all occupied areas for which such form of ventilation is to be used. Systems shall comply with all applicable provisions hereinbefore listed. Ventilation air quantities shall be guided by ASHRAE Standard 62. Filtration shall be applied to mechanical ventilation supply or make-up air.

(b) Ventilation for restaurant cooking equipment.

(1) Ventilation for restaurant cooking equipment shall be guided by NFPA Standard 96.

(2) Where the designer prefers not to exhaust above the highest roof, and higher than any adjacent roof at the property line, a grease vapor collector, exhaust fan, and fire barrier system approved by a nationally-recognized testing agency, may be used instead, provided

the designer furnishes details in his permit application, the installation is in accordance with the agency's approval.

(3) Hood and duct design shall be indicated on plans, to scale, with exhaust air and filtered make-up air quantities indicated.

(4) Hood design shall conform to figure 1 dated July 1981 and figure 2 dated July 1981 located at the end of this chapter; or design computations or test results satisfactory to the director shall be provided.

(c) Toilet exhaust shall be four cfm per square foot of toilet room floor area. If the make-up air is air conditioned, the exhaust rate may be reduced to two cfm per square foot. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-13 Garage ventilation. Ventilation for enclosed automobile parking garages shall be guided by the following:

(1) Each story or level of a parking garage shall be mechanically ventilated unless all of the following requirements are met:

(A) More than half the wall area is open, in a wall length of at least (forty per cent) the perimeter;

(B) There is no parking attendant or other employee normally working in the space; and

(C) There is no such unusual or irregular shape of the story or level that the majority of the area would usually not receive natural air motion.

(2) Mechanical ventilation for parking garages shall require a minimum of one and five tenths cfm per square foot (seven and five tenths liters per second per square metre) over the entire floor area requiring ventilation. At locations where traffic is such that congestion can occur, for example at an exit, the air distribution shall be adjusted to provide more air.

(3) Ventilation may be by supply or exhaust, but shall be arranged for reasonably even air distribution.

(4) An engineered system may be employed, using the equation: $Q = Kn/C$, where Q = exhaust ventilation rate, cfm; K = 1,380,000 (a constant); n = number of cars running at one instant; C = allowable carbon monoxide concentration, parts per million. For residential parking garages, n = 1.18 per

cent of total parking spaces. For other parking garages, n may be higher. For engineered systems C shall be selected with regard to threshold limit CO and as approved by the director. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-14 Right to inspect. The director, upon showing credentials, shall be granted entrance to any building premises at any reasonable hour and permitted to inspect or reinspect or to otherwise investigate an air conditioning or ventilating system or any of its component parts or the conditions resulting therefrom for compliance with the provisions of this chapter. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-15 Variation. If the director finds that there are great practical difficulties or unnecessary hardships in complying with these rules, the director may make a variation or temporarily set aside such requirements if the spirit of the provision shall be observed and public health, safety, and welfare assured. If the director permits such variation, it shall apply to all buildings, installations, or conditions where the facts are substantially the same. A file of such variations shall be maintained in the department and this file shall be periodically reviewed for the purpose of improving the rules and keeping them current. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-16 Penalty for violation. (a) Any person violating any provision of this chapter shall be subject to the penalties specified in section 321-18, HRS.

(b) Any permittee or permit applicant violating any provision of this chapter shall be subject to permit revocation, suspension, or denial. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

§11-39-17 Severability. If any provision of this chapter, or the application thereof to any person or circumstance is held invalid, the invalidity does not affect other provisions or applications of the chapter which can be given effect without the invalid provision or application, and to this end the provisions of this chapter are severable. [Eff. January 31, 1983] (Auth: HRS §§321-9, 321-11) (Imp: HRS §§321-1, 321-11)

The Department of Health authorized the repeal of Chapter 28, Public Health Regulations and the adoption of Chapter 39 of Title 11, Administrative Rules on January 3, 1983 following public hearing held on Oahu on August 26, 1982 and October 6, 1982, on Hawaii on August 25, 1982 and October 14, 1982, on Kauai on August 31, 1982 and October 19, 1982, on Maui on August 24, 1982 and October 13, 1982 after public notice was given in the Honolulu Star-Bulletin on August 3, 1982 and September 11, 1982, in the Hawaii Tribune-Herald on August 3, 1982 and September 14, 1982, in the Garden Isle on August 3, 1982 and September 13, 1982, and in the Maui News on August 3, 1982 and September 13, 1982.

Chapter 39 of Title 11, Administrative Rules and the repeal of Chapter 28, Public Health Regulations shall take effect ten days after filing with the Office of the Lieutenant Governor.

CHARLES G. CLARK
Director
Department of Health

APPROVED:

GEORGE R. ARIYOSHI
GOVERNOR
STATE OF HAWAII

Dated: 1-19-83

APPROVED AS TO FORM:

Deputy Attorney General

Filed: January 20, 1983

Effective Date: January 31, 1983

FORM 1

DEPARTMENT OF HEALTH
STATE OF HAWAII

NOISE & RADIATION BRANCH
ENVIRONMENTAL PROTECTION & HEALTH SERVICES DIVISION

APPLICATION FOR PERMIT

☐ Air Conditioning ☐ Ventilation

(Submit an original and a duplicate with one set of plans. One copy will be returned after review if permit is granted.)

I hereby apply for a permit on the project described below and enclose plans which were prepared by me or under my direct supervision. I certify that to the best of my knowledge the design is in complete accordance with the Air Conditioning and Ventilation Regulations of the Department of Health. (Except as noted under "Remarks.")

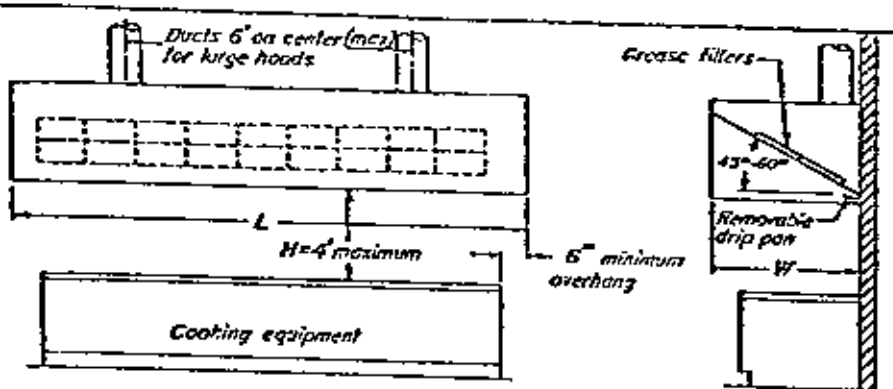
FIRM & ENGINEER	PROJECT
Firm: _____ Engineer's Name: _____ Address: _____ City: _____ Zip: _____ Phone: _____	Name: _____ Address: _____ City: _____ Zip: _____
Type of Occupancy _____	Design Conditions Out: _____ DB _____ WB In: _____ DB _____ % RH

Unit or Zone No.*						Project Total
Area Served (Name)						
Conditioned Area, Sq. Ft.						
Persons Occupying						
Outdoor Air, CFM						
Supply Air, CFM						
Zone Total Heat, BTUH						
Unusual Heat, BTUH						
Equipment Capacity, Tons						
Exhaust: CFM						
: Location						

Remarks:

DEPARTMENT OF HEALTH SECTION	ENGINEER'S CERTIFICATION
Permit for installation, alteration or operation is granted in accordance with this application and its accompanying plans. This permit is revocable for cause. Within 60 days after completion of the system, the applicant shall notify the Department of Health in writing that the system is installed and operating substantially as designed. Signature: _____ Name: _____ Title: _____ PERMIT NO. _____ Date: _____ Remarks: _____	Signature: _____ Date: _____ _____ Engineer's seal shall be affixed

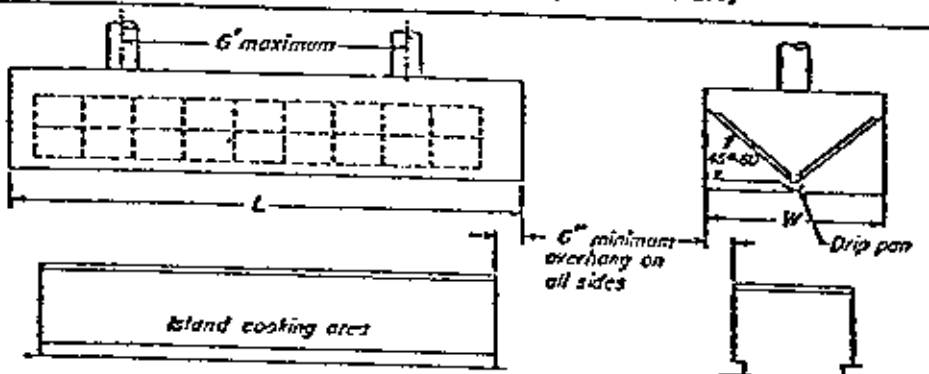
*Attach additional pages if more data required.



HOOD AGAINST WALL

Q= 80 cfm/sq ft of hood area (80 WL)
Not less than 50 cfm/sq ft of face area (50PH)
Duct velocity = 1000-4000 fpm, to suit conditions
Entry loss = (filter resistance + 0.1") + 0.50VP (straight take off)
Entry loss = (filter resistance + 0.1") + 0.25VP (tapered take off)

P=perimeter of hood = 2W + L



ISLAND TYPE HOOD

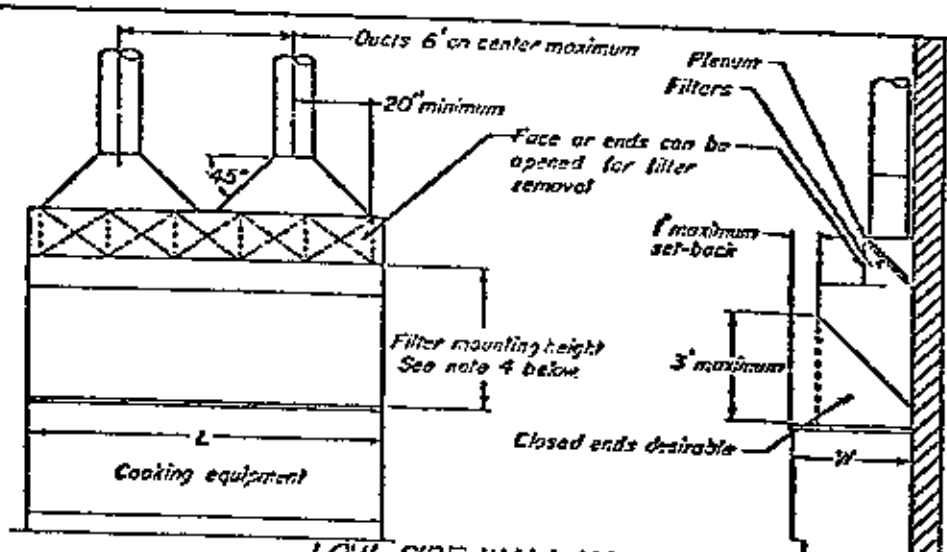
Q = 125 cfm/sq ft of hood area (125 WL)
Not less than 50 cfm/sq ft of face area (50 PH)
Duct velocity = 1000-4000 fpm, to suit conditions
Entry loss = (filter resistance + 0.1") + 0.50VP (straight take off)
Entry loss = (filter resistance + 0.1") + 0.25 VP (tapered take off)

P=perimeter of hood = 2W + 2L

Note:
See VS-911 for information about filters and fans

KITCHEN RANGE HOODS

Figure 1



LOW SIDE WALL HOOD

Q=200 cfm/lineal ft of cooking surface (200 L)
Duct velocity = 1000 - 4000 fpm, to suit conditions
Entry loss=(filter resistance + 0.1") + 0.5 VP (straight take off)
Entry loss= (filter resistance + 0.1") + 0.25 VP (tapered take off)

NOTES FOR KITCHEN HOODS

Filters:

1. Select practical filter size.
2. Determine number of filters required from manufacturer's data. (Usually: 2 cfm maximum exhaust for each sq in of filter area)
3. Install at 45°-60° to horizontal. Never horizontal.
4. Filter mounting height (Reference 66)
   a. No exposed cooking flame — 1½' minimum to lowest edge of filter.
   b. Charcoal and similar fires — 4' minimum to lowest edge of filter.
5. Shield filters from direct radiant heat.
6. Provide removable grease drip pan.
7. Clean pan and filters regularly.

Fan:

1. Use upblast discharge fan. Downblast is not recommended.
2. Select fan for design Q and SP resistance of filters and ductwork.
3. Adjust fan specification for expected exhaust air temperature.

KITCHEN RANGE HOOD

Figure 2